

## Ocean Surface Salinity Measurements with the JPL Passive/Active L-/S-band (PALS) Microwave Instrument

William J. Wilson\*, Simon H. Yueh, Steve Dinardo  
Jet Propulsion Laboratory, California Institute of Technology  
4800 Oak Grove Drive, Bldg. 168-327, Pasadena, CA 91109

Tel: (818) 354-5699, FAX: (818) 393-4683, E-mail: [william.j.wilson@jpl.nasa.gov](mailto:william.j.wilson@jpl.nasa.gov)

In August 2000, the Passive/Active L-/S-band (PALS) aircraft instrument was flown near Monterey bay California to develop techniques for accurate measurements of Sea Surface Salinity (SSS). The measurements were made flying over moorings and ships, which measured the Sea Surface Temperature (SST) and the SSS. Data from these measurements will be presented. These measurements demonstrated our ability to measure SSS with an accuracy of 0.2 Practical Salinity Scale (PSS) or parts per thousand. Data from a flight on August 24, 2000, over the ship Vito-C just south of Monterey bay, is shown in Fig. 1a. This track was across a small SST and SSS front at  $-122.4^\circ$  longitude. At this location, the wind speed was  $\sim 8$  m/s, the scatterometer backscatter had a small decrease and the SST decreased by  $\sim 4$  C.

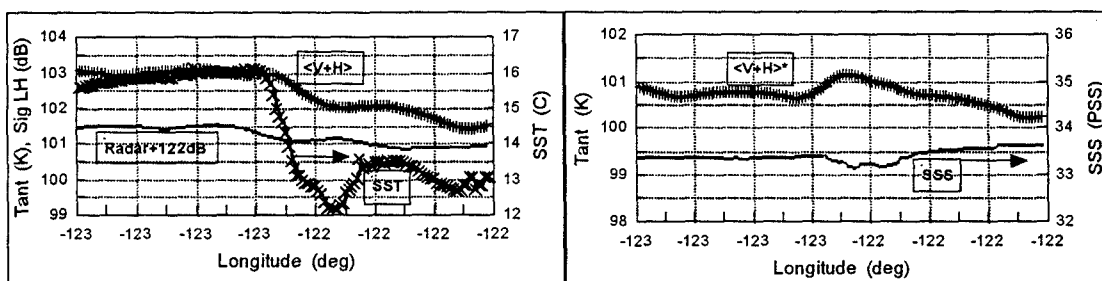


Fig. 1(a)

Fig. 1(b)

The hatched curve is the uncorrected  $\langle V+H \rangle$  radiometer data (K), the solid curve is the radar backscatter (dB), and the cross-hatched curve is the SST (deg C). Fig 1b shows the corrected radiometer data  $\langle V+H \rangle^*$  in the hatched curve and the SSS data are shown in the solid curve. Over the length of the track, the SSS increased by  $\sim 0.3$  PSS, and the radiometer brightness temperature decreased by  $\sim 0.3$  K.

After correcting the data for the roughness, using the radar data, it was necessary to use a temperature correction of 0.3 K per deg C, to get the radiometer data to be consistent with the change in salinity as predicted by the Klein and Swift (1977) salinity model. It must be noted that this temperature dependence factor is larger than predicted by the Klein and Swift model. This is one of the biggest uncertainties in analyzing this SSS data. To reduce this error source, it is planned to make a measurement on a small controlled salinity pond this summer using the PALS instrument. Measurement will be made over a range of salinity values from 20 – 40 PSS and a temperature range of 15-30 deg C. Results of these measurements will be presented.

Reference: L. A. Klein and C. T. Swift, "An improved model for the dielectric constant of sea water at microwave frequencies," IEEE Trans. Antennas and Propagation, Vol. AP-25, no. 1, pp. 104-111, January 1977.